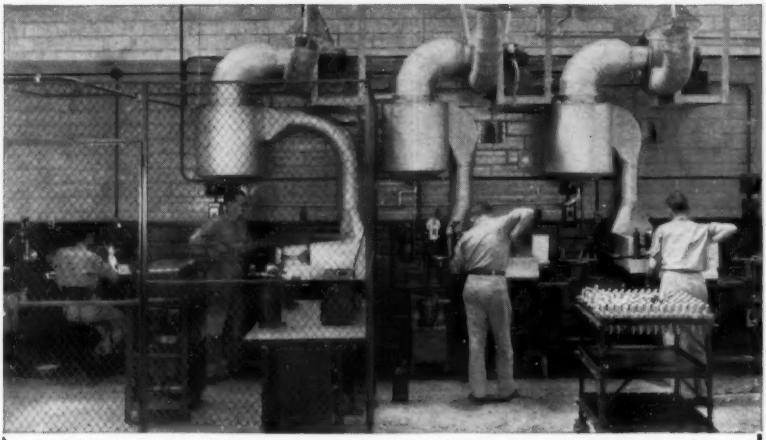
Occupational HAZARDS

FEBRUARY 1940

There's Profit in Prevention



K & B Exhaust System in the oil injector testing laboratory, Cummins Engine Company, Columbus, Ind.; The Austin Company, Engineers and Builders

KIRK & BLUM Exhaust System

Eliminates Oil Spray . . . Conserves Heat

In the testing of high pressure Diesel Engine oil injectors there is surplus oil spray. To avoid injurious working conditions and oil contamination, Kirk & Blum Engineers designed a unique exhaust system for the Cummins Engine Company, manufacturers of Diesel Engines. This system, not only carries off the spray, but, by employing a filter trap ahead of the suction fan, cleans the air which is returned to the room, thereby conserving heat.

If you, have a dust or fume removal problem, our engineers will make a careful survey and recommend a definite solution. Write today for details of this service.

THE KIRK & BLUM MFG. CO. · 2816 Spring Grove Ave., Cincinnati, Ohio

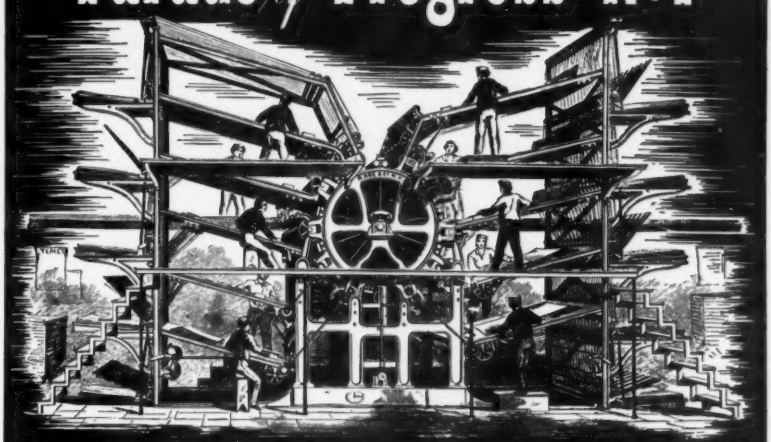
Chicago Representative: C. P. Gulon, 1661 N. Milwaukee; Pittsburgh: Bushnell Mchy. Co., 311 Ross St.; Liberty Eng. & Mfg. Co., Inc., 1450 S. 15th St.

KIRK & BLUM

DUST AND FUME CONTROL

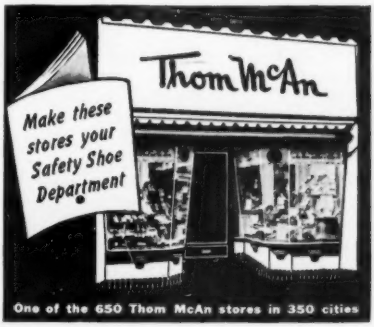
ENGINEERS AND CONTRACTORS

Parade of Progress—No. 1



A marvel in its day, obsolete now, this High Speed Newspaper Printing Press, invented by R. Hoe around 1860

AMERICAN industry marches on, as new equipment, modern methods, relentlessly replace the old. A part of this parade of progress is the revolutionary new Thom McAn Foot Safety Plan, which has been adopted in hundreds of the Nation's leading industrial plants. This unique plan is absolutely free. It does *not* require you to carry a stock of Safety Shoes and be burdened with all kinds of "shoe store problems" and expenses. It *will* reduce your accident losses. Clip the coupon and get the whole story.



One of the 650 Thom McAn stores in 350 cities

THOM McAN: SAFETY SHOE DIVISION
555 FIFTH AVENUE, NEW YORK

Without obligation, please send me full details of your Foot Safety Plan. If you will stock Safety Shoes for our plant in your own stores, at no risk or expense to us, and have your own trained men fit them, I want to know all about it.

Company name .....

Company address .....

Executive's name .....

The publications briefly described in this service department are prepared by manufacturers' technical experts. The data they contain on equipment supplies and prevention methods applies to varied phases of occupational hazard problems. Note those items desired on coupon below and send to Occupational Hazards, 812 Huron Rd., Cleveland, Ohio.

240—DUST CONTROL
Five new bulletins have been issued by Northern Blower Company, complete with illustrations and engineering specifications. The bulletins cover: Norblo Square Type Air Filter; Norblo Bag Type Dust Arrester; Norblo Screen Type Dust Arrester; Norblo High Speed Low Power Exhaust Fans; and Norblo Slow Speed Low Power Exhaust Fans.

241—STAMPING PRESSES
Booklet "Stamping Presses, Their Safety Uses and Abuses" by J. C. Junkin, W. R. Weust, and J. I. Junkin describes various factors of importance in safe operation of stamping presses.

242—SAFETY TOOLS
Catalogue and price list giving complete specifications for the Ampco line of Non-Sparking Safety Tools.

243—SAFETY SHOES
Safety poster and leaflets, selling advantages of safety shoes to employees, is a service offered to industry by Thom McAn. See Advertisement on page 1.

244—WASHFOUNTAINS
Brochure describing, giving specifications for, and illustrating Bradley Washfountains, Showers, and Drinking Fountains. See Advertisement on page 11.

245—BLOWERS
Catalogue of blowers and hi-power motors, including specifications, has been issued by Sawyer Electrical Manufacturing Company.

246—STRETCHERS
Folder describing the several types of folding stretchers and litters manufactured by A. Smith & Sons Co., Inc.

247—SAFETY GOGGLES
Recent improvements in Ful-Vue Safety Goggles are covered in the news bulletin just published by American Optical Co. See Advertisement on Inside Back Cover.

248—SHOWERWAY
A portable, sanitary hand washing fountain just developed by Lyon Metal Products is described in the catalogue issued by them.

249—VACUUM CLEANING
Equipment for industrial vacuum cleaning is the subject of the folder available from U. S. Hoffman Machinery Corp.

250—WEATHER MAGIC
A monthly publication of the Trane Company devoted to air conditioning, heating and ventilation.

253—FLOOR SAFETY
Handbook of floor maintenance to prevent accidents, and to control the accumulation of toxic or irritating substances, has been issued by the Flexrock Company.

254—WELDING HELMETS
A four page bulletin describing welding helmets and accessory equipment of Mine Safety Appliances is just off the press. See Advertisement on Back Cover.

FREE LITERATURE COUPON Clip out and paste on postcard or enclose in envelope.
Mail to: OCCUPATIONAL HAZARDS, 812 Huron Road, Cleveland, Ohio.

Nos. of desired items .....

Firm Name .....

Your Name ..... Position .....

Street and Number of Your Firm .....

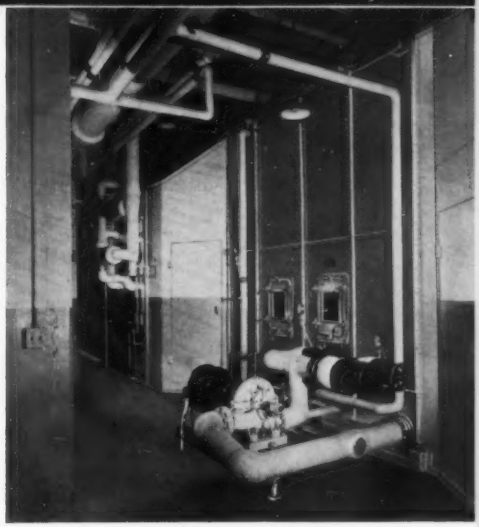
City ..... State .....
FL-17

WASHED AIR IS CLEAN AIR

IF YOU want the air in your plant to be free from dust, you can have it that way—and at moderate cost by installing a

"Buffalo"

AIR WASHER



Installation of a Special Type "B" Copper Buffalo Air Washer

It keeps the air clean, fresh, and properly humidified in winter, and washed and cooled in summer. Your employees will feel better—work better.

Buffalo Air Washers are equally valuable in those plants having a manufacturing process that requires dust free air.

Yes, it's good business to keep the air in your plant clean with a Buffalo Air Washer.

For complete information, write for our new bulletin, "Clean, Fresh Air."

BUFFALO FORGE COMPANY

191 MORTIMER ST., BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

REPORTS come into us from a number of cities throughout the country that attendance at safety meetings has been greater during the last few months than during any previous period. Management is showing an increased conciousness of the value of having their employees participate in the work of local safety groups.

It is also interesting to note the increased attention being given to occupational diseases at these meetings. Most safety men are now considering safety in its broader sense—not only physical accidents, but the more subtle hazards leading to occupational diseases—systemic poisoning, dermatitis, respiratory diseases, and the like. It is unusual to find a safety meeting these days where at least one of the major subjects of discussion is not occupational disease hazards.

While this is not startling news, it is indicative of the increasing comprehensiveness of safety programs. It was but a few years ago that the true conception of occupational disease prevention was unknown.

This trend may be expected to expand purely "safety" work to the point where the smallest plant will recognize and control occupational disease hazards. Discussion of the subject at safety meetings has the added value of enlisting co-operation of supervisory men in making control programs work.

DR. A. LLOYD TAYLOR, formerly Director of Chemistry, Pease Laboratories, New York, has just joined the technical staff of Oakite Products Company.

SOME OF THE BOYS at Detroit Rex Products Company have gotten themselves promoted. W. W. Davison, Vice-President, announces that H. R. Norgren steps up to Assistant General Sales Manager in charge of Special Accounts; D. E. Williard, Assistant General Sales Manager in charge of Regions and Branch Offices; and R. A. O'Reilly, Manager of Dry Cleaning Division. Congratulations, and good luck!

NO FOG—NO STEAM ON GOGGLES

Reduce eye accidents! Men aren't tempted to take off clean goggles ... and today they CAN be kept clear for a full day!

LENSITE Prevents steaming, fogging, smoking! Used in hundreds of plants. Not one tube has ever been returned. Try Lensite. "It Works." 25¢. LENCO LABORATORIES, 624 Bondi Building, Galesburg, Ill. Member National Safety Council

MEETINGS SCHEDULED

February 23-24, Stillwater, Okla.—4th Annual State Safety Conference

March 5-6 (*New Date*), Philadelphia, Pa.—Greater Philadelphia Safety Conference

March 11-12, Boston, Mass.—1940 Massachusetts Safety Conference

April 9-11, Pittsburgh, Pa.—Western Pennsylvania Safety Council, Annual Safety Engineering Conference

April 15-16, Austin, Texas—Texas Safety Convention

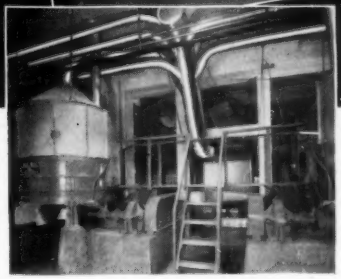
April 16-18, Columbus, Ohio—1940 All-Ohio Safety Congress

April 16-18, New York, N.Y.—11th Annual Greater New York Safety Conference

April 22-23, Toronto, Canada—Silver Jubilee Convention, Industrial Accident Prevention Associations

April 25, Kenosha, Wis.—13th Rock River Valley Safety Conference

April 30, May 1-2, Chicago, Ill.—18th Annual Midwest Safety Conference

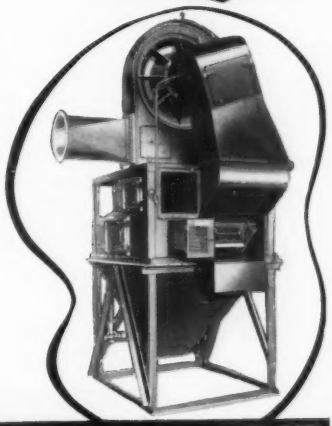


ROTO-CLONE collects lead oxide dust for Presto-lite

Hazards created by operations which produce dust are easily and economically eliminated with the use of AAF's dust control equipment.

In the Presto-Lite plant, the collection of lead oxide dust is effectively handled by a Type W Roto-Clone which requires a minimum of floor space and does away with the necessity for fans, pumps, tanks, or other auxiliary equipment. This Roto-Clone unit serves feeder-bins and mixers located on separate floors, as illustrated.

Write for bulletins descriptive of various American Air Filter units for the control of process dust.



AMERICAN AIR FILTER CO., INC.
Incorporated
279 Central Ave. **Louisville, Ky.**

TYPE W

ROTO-CLONE
WATER SPRAY DYNAMIC PRECIPITATOR

● BLACK CATS don't mean a thing to the worker who wears HY-TEST SAFETY SHOES. He's "bad-luck-proof."

● His toes are safe even when the most unavoidable accident occurs. He knows that the steel box toe with the anchor-flange *insures* his toes against injury.

● He appreciates the extra comfort of the exclusive Saf-Eze one-piece back construction.

● He likes HY-TEST good-looks and good fit. These are the reasons why more and more companies are switching to the largest-selling safety shoes in the country today... the shoes that save time, money, and man-power.

ANCHOR FLANGE steel box toe
Flange locks steel toe in position.
Rustproof steel in box toe.
Original box toe with anchor flange.

SAF-EZE one-piece quarter
No ripping at the back.
No binding at the seams.
No rubbing at the heels.

GRADE A genuine leather
Dress shoe style and comfort.
One-piece leather insole.
Heavy durable outsole.

• Feature for feature, no other shoe can match the all-round superiority of HY-TEST SAFETY SHOES. In a variety of soles and heels to meet every industrial need. Write today for a HY-TEST representative to call.

HY-TEST SAFETY SHOES

Hy-Test Division, The International Shoe Co., Saint Louis, Mo.

Occupational HAZARDS

FEBRUARY 1940

Volume 2 Number 5

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FRONT COVER—SAFE PRACTICE IN LADLE POURING
Courtesy, Republic Steel Corp.

Copyright, 1940, by the INDUSTRIAL PUBLISHING CO. Published Monthly.
812 Huron Road, Cleveland, Ohio

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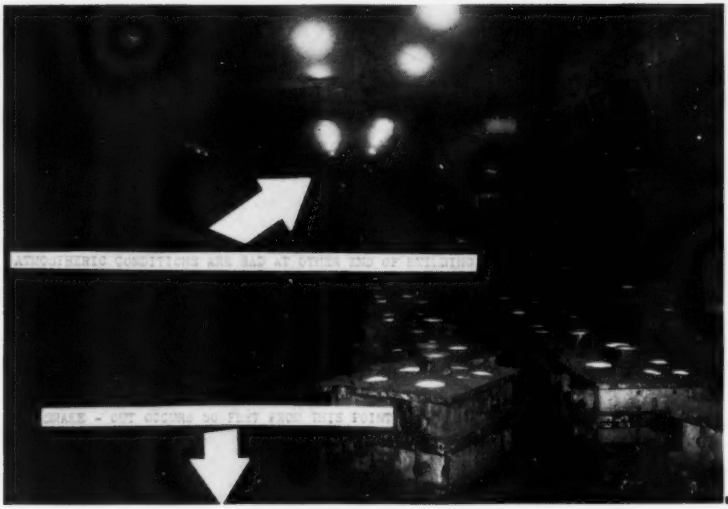
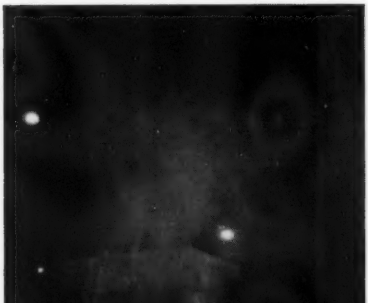


Before—Atmospheric conditions bad. View above taken from point 50 feet from shake-out. Below, a dust problem.



IN THE manufacture of steel castings, whether small, medium, or large, a considerable amount of dust is set in motion in the different operations required in the cleaning of them.

It is the purpose of this article to discuss the remedy and tell just how this very dusty condition is controlled.

The details of cleaning a casting are common knowledge. The casting upon which attention is focused today has many tons of burnt sand adhering to it. It can not be touched without stirring up dust. The thing most needed is a ventilating system that will lift the dust stirred up by the different operations immediately.

In the foundry are three points to which attention will be called. At these points the highest concentrations of dust are formed. First, the Casting Pits; Second, the Shake-out; Third, the point at which the casting is finished by the hammerman.

Foundry Eliminates Dust Problem

By P. S. Tanner
United Engineering & Foundry Co.

The Removal of Silica Dust from Large Castings Three Crane Size

With proper ventilating system provided, air in the entire wing of the building clears rapidly. These photos courtesy H. H. Robertson Co.

Castings of this size are cast in pits measuring 32 feet by 14 feet with a depth of 8 feet.

A casting weighs about 350,000 pounds with an addition of from 20,000 to 30,000 pounds of burnt sand, hooks, and rods that stick to it.

It takes ten days for this casting to cool sufficiently to be taken out of the pit. On the eighth day after the casting is poured, the cope is removed; then, on the tenth day the casting is taken to the Shake-out. A large amount of dust arises at both of these operations; hence, it takes place at 4 A.M. when there are very few men at work. Three cranes are required to take the casting to the Shake-out.

Then comes the Shake-out Floor which measures 80 feet by 60 feet. If the casting is too large to be swung against the bumping block, the large drop ball is brought to it, but if the casting is of one crane size it may be swung against the bumping block. In either case, an immense amount of dust is set in motion. Shake-out operations occur also at night when few are working.

In the third place the casting is now set to one side of the shake-out floor for the day-turn workmen. When ready the hammermen get busy with their job. Each has an air hammer, is wearing goggles, and the most approved type of respirator.

Ventilation

Ventilation is very important to all foundries, especially in the pouring and shake-out sections. In the pouring section, ventilation is not such a great problem as, in most cases, considerable heat is generated here. This heat sets in motion the dust and smoke particles floating in the air during the process of pouring, and literally pushes both smoke and dust particles out of the roof ventilators.

The shake-out operation presents a greater ventilation problem. In a plant

where small castings are manufactured, this operation is simple. A permanent small section of the plant can be assigned to this activity. With underground suction or enclosed small cabinets being furnished, any dust created in this shake-out can be controlled with ease.

In this plant, however, we have castings, that weigh 200,000 pounds to 350,000 pounds. These castings are poured and shaken out in the same area. We have, in our plant, an area of about eight bays, each 23′0″ long, where we pour and shake-out these large castings. After studying and visiting many foundries and their ventilation methods, we consulted expert ventilation engineers with whom we worked out a plan that we felt sure would give entire satisfaction.

Remember that these large castings, when shaken out, are still warm. Thus, we took advantage of this difference-in-temperature-action to push out the troublesome dust through roof ventilators. For example, 80° difference in temperature will create a velocity of about 800 lineal feet per minute for a column of air at a height of 70′0″.

We decided to partially enclose these eight bays by baffles of steel sheets, making the particular area in which large castings were shaken out more or less a separate unit of the building. Experts advised us of the necessity of forty-five air changes per hour in this section. You must remember that, in addition to the heat given off by the castings, a large amount of dust is shaken into the air. This dust, in itself, is heavier than air at normal temperature but, because of the heat from the castings, these dust particles move upward through the roof. Roof ventilators, of the proper size and design are necessary to take care of this volume of dust-laden air.

However, since foundry operation continues during the entire year, there are times when the difference in temperature is slight, such as in the case of summer months when, in addition

(Continued on page 23)

After—10 minutes after shake-out. Ventilators remove gases continuously from newly poured castings.

● Production heads and welfare men in thousands of the best plants in the country, consider their Bradley Group Wash Fixtures as important as their production equipment.

The fact alone that 56% of the 1939 output of Bradley Washfountains went to past users is itself proof of the water—, time—, and space-saving advantages provided.

You can modernize your washrooms and have these advantages, too. Each Washfountain serves up to 10 men simultaneously with clean running water—and requires 1/10 the piping installation, because one Washfountain serves as many men as 10 individual wash bowls.

Section of the Norton Co., Worcester, Mass., washroom

Write for Washroom Plan Book

To help you modernize, or lay out washrooms for new buildings, our "Plan Book" will be mailed on request. Write for a copy with names of plants in your locality equipped with Bradley Sanitary Group Wash Fixtures. BRADLEY WASHFOUNTAIN CO., 2259 W. Michigan St., Milwaukee, Wis.

BRADLEY

WASHFOUNTAINS and SHOWERS

What is YOUR share of the $100,000,000?

Eye injuries cost industry $100,000,000 each year. Every industrial plant pays part of the cost of tens-of-thousands of eye injuries every year.

AVAILABLE statistics make it impossible to say precisely what the eye hazards of industry cost in terms of blindness and defective vision. We do, however, have information about particular states, about certain large groupings of industries, and other data developed by the United States Public Health Service and the U. S. Department of Labor which together make possible some reasonably authentic estimates.

On the basis of these estimates, it may be conservatively stated that there are in the United States today close to 8,000 persons who have been blinded by the eye hazards of industrial occupations and more than 80,000 persons who have lost the sight of one eye as a result of these hazards. To this total there are added each year at least 75 persons who lose the sight of both eyes and 2,000 persons who lose the sight of one eye

as the result of industrial or occupational hazards. The number of men and women in industry who lose permanently part of the vision of one or both eyes undoubtedly runs into tens of thousands each year. These are conservative estimates even if we assume that the statistics on which they are based represent a complete reporting of serious eye injuries. We know, however, that the number of injuries reported is only part of the total eye injuries which actually occur. In many instances the injured worker does not know he is entitled to compensation and no one enlightens him; often the seriousness of an eye injury or the fact that it has or will result in permanent loss of vision does not become apparent until long after the injury has occurred and in many such cases for one reason or another no official record of the accident is made.

One of the most widely experienced safety engineers in America has expressed the opinion (privately) that the number of eye injuries reported to industrial commissions throughout the country is at least a 50 per cent understatement of the real situation.

Available statistics concerning the financial cost of industrial eye hazards also are fragmentary if we consider the actual long-range cost to the community rather than merely the known dollar loss to industry.

In earlier years, data on this subject available to the National Society for the Prevention of Blindness led to our calculation of the net cost of industrial eye injuries at $50,000,000 a year. Study of more recent information on this subject leads to the conclusion that this cost is more than $100,000,000 a year. Every industrial operation bears a share of this cost.

by LOUIS RESNICK, Director of Industrial Relations, National Society for the Prevention of Blindness.

But even this huge estimate of $100,000,000 does not take into account the incalculable but very large cost to the community of having in its midst an ever increasing number of blind and partially blind men and women who only a little while ago were for the most part self-supporting and efficient industrial workers. Some notion of the magnitude of this cost to the community may be had from the fact that federal, state, and local social security agencies are spending over $12,000,000 a year for relief of 44,000 needy blind persons while other public and private relief agencies are spending millions of dollars for aid to families whose breadwinners either are unemployed or whose earning capacity has been greatly reduced because of permanent or partial blindness resulting from industrial eye hazards.

Eye Injuries Preventable

More startling than these figures about the loss of vision and loss of money is the fact—and I think it has been demonstrated to be a fact—that 98 per cent of all this loss, human and monetary, is needless. Ninety-eight per cent of all industrial accidents can be prevented, and this is at least as true of eye accidents as of those resulting in injuries to any other part

of the body. In the opinion of many of the best safety engineers of America there is a greater certainty of preventing eye injuries than of those to any other part of the body.

What is necessary to avert this needless waste of sight and money? Five things, which I would briefly summarize as follows:

First—there is needed a realization by the management of industries that eye injuries can be prevented and a genuine determination to do this. Even after 20 years of campaigning by the National Safety Council, the National Society for the Prevention of Blindness, and various other organizations, the average industrial executive still does not know or does not believe that accidents can be prevented. This, despite the fact that a number of companies have demonstrated it is possible and have been perfectly willing to share with anyone their experience and knowledge of how it can be done.

Second—there is needed, on the part of management, the willingness and often the courage to issue the administrative orders which will insure an equal determination on the part of their sub-executives—the supervisors and foremen—to wipe out eye accidents. In many instances only a mandatory rule, strictly, though diplomatically enforced, will accomplish this purpose. The average industrial executive prefers instead to leave well enough alone; he prefers going on paying compensation for eye injuries or insurance premiums which relieve him of this financial risk without disturbing the routine of production or employer-employee relationship, with the result that men are blinded or partially blinded needlessly in his shops every year.

Third—There is the need of making the plant physically safe and of providing goggles, masks, and other protective equipment wherever it is needed. Too often, at this late date, eyes are lost simply because of the failure to install a guard which may cost a few dollars or to provide a pair of goggles costing a dollar or two or three. This, despite the fact that a single case of blindness in New York State may and frequently does cost the employer or his insurance underwriter $30,000. It is however, not enough simply to buy goggles and install safety devices.

There is need to provide for proper maintenance of safety equipment, proper fitting and refitting of goggles continuously if this equipment is to be conscientiously used.

Fourth—there must be a continuous, sincere, and well-planned program of educating workers and their supervisors concerning the eye hazards of industrial occupations, their real causes, and methods of eliminating or counteracting them. Without such a continuous program, safety rules and safety equipment are largely ineffectual.

Finally—there must be—and it can be had more easily than the average industrial executive seems to believe or would have you believe—the complete co-operation of the workers themselves in the program for eye protection in industry. Here too, some few plants, both union and non-union—have shown it is possible to have throughout the year the complete co-operation of employees, while in the average plant either the safety engineer, the manager or the foreman continues to attribute to the workmen or to fear of stirring up labor trouble the main responsibility for accidents.

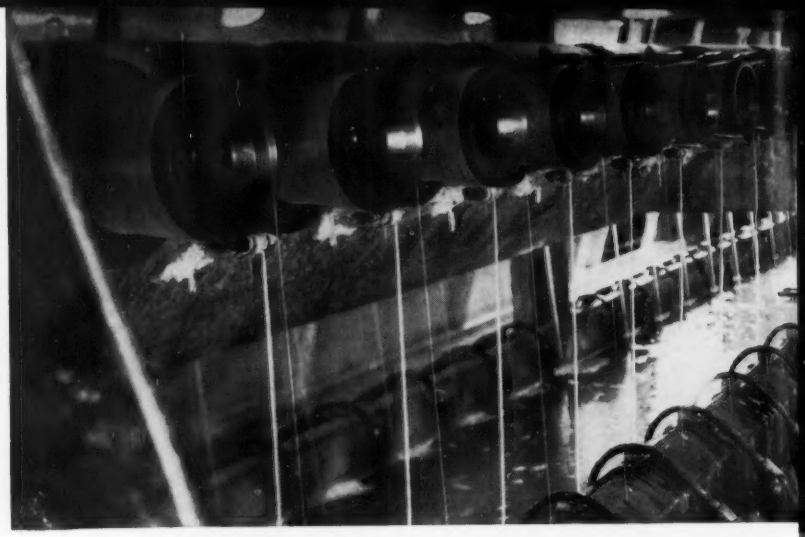
Iron Pourer protecting his eyes with a Type C-3 Jackson Eyeshield

JACKSON Eyeshields *for Safety*

Available in four visor shades (clear, smoked, amber, green), Jackson cover-all shields are widely used throughout industry for protecting the eyes and face. Light, well ventilated, fire-resisting, they provide clear, undistorted vision. Visor depth 4"—others to 9". Adjustable at any angle. Sparks do not affect them nor will hot metal stick. All-purpose Type C-3 illustrated here, together with fourteen other types are fully described in our Eyeshield folder. Get your copy today.

If your dealer can't supply you with a genuine Jackson, please write to us.

JACKSON ELECTRODE HOLDER CO.
Department O-2, 15122 Mack Avenue, Detroit, Michigan



Problems in Safe Handling OF

This view of the new Industrial Rayon plant indicates one method of reducing possible hazard—completely enclosing the process.

WHAT have solvents to do with safe practice? It is significant that fire hazard and solvent toxicity go hand in hand with volatile inflammable solvents. No matter how low in the toxicity scale experimenters may place a solvent; no matter how safe a solvent is reputed to be; and no matter how pleasant its vapors may appear, it can never replace fresh air, for no solvent has as yet been discovered that can replace it.

When a solvent exhibits a tendency to transform itself into a vapor, it is called a volatile solvent. If the vapors, when mixed with air, can catch fire, the solvent is inflammable. Anything that will catch fire naturally presents a constant fire hazard.

The degree of inflammability of a substance is indicated by what is termed the flash-point. This can be explained otherwise as the lowest temperature at which the vapors, when mixed with air in the right proportion, will ignite.

The "ignition point" is the temperature at which the vapor-air mixture will, under favorable conditions, take fire spontaneously. At this temperature more heat is generated than is lost, so that combustion becomes self-propellent. Mixtures of inflammable vapor and air are explosive or inflammable only within a limited range of concentration. The addition of an non-inflammable liquid to a solvent or a mixture of solvents may either raise the flash-point of the resultant solution or make it non-inflammable. However, a flame-proof mixture may become inflammable upon partial evaporation.

When a mixture of solvent vapor

ing OF SOLVENTS

By
DR. IBERT MELLAN

and air is inhaled, it quickly finds its way into the blood stream, and subsequently comes in contact with every body tissue. Should the concentration of the solvent vapor be high and the inhalation be prolonged, injurious effects will be the natural outcome. Of course, since individuals differ in their susceptibility, the degree of injury will vary in extent or seriousness. Many solvents are reputed to be safe or non-toxic. However, as in many instances, solvents have been considered safe until a fatal accident has occurred.

Since some solvents are more toxic than others, experimenters have attempted to use this fact by classifying solvents according to their toxicity. Lazarew has published the following lists of solvents which are based on their relative toxicity. The following chlorinated solvents, presented in decreasing toxicity, produce a light narcosis when inhalation is not prolonged.

1. Ethyl chloride
2. Carbon tetrachloride
3. 1, 1, 1-Trichloroethane
4. Methylene dichloride
5. Trichloroethylene
6. Chloroform
7. Ethylene dichloride
8. Tetrachloroethylene
9. 1, 1, 2-Trichloroethane
10. Tetrachloroethane
11. Pentachloroethane

In fatal cases of poisoning, the relative toxicity of some of the chlorinated solvents is as follows:

1. Ethyl chloride
2. Ethylidene chloride
3. Carbon tetrachloride
4. 1, 1, 1-Trichloroethane
5. 1, 1, 2-Trichloroethane

(Continued on page 38)

The halogenated, aliphatic, and aromatic compounds are used in many industries of which some are the drug, rubber, oil, grease and fat extraction, as paint and varnish removers, in textile scouring soap, in dry-cleaning, paint, and lacquer industries. Some of these solvents are methylene dichloride, chloroform, carbon tetrachloride, ethylene dichloride, dichloroethylene, trichloroethylene, tetrachloroethylene, pentachloroethylene, monochlorohydrin, dichlorothydrin, monochlorobenzene, dichlorobenzene, and amyl chloride. These halogenated solvents stand out because of their powerful narcotic qualities.

Right off the Docket

The trend of litigation on workmen's health and accident compensation is reflected in these briefs of the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist.

Liberal Construction Brings Increased Award

The employee's injuries necessitated the amputation of the first, second and third fingers at the middle of the second joint of each finger. The employee claimed he suffered a two-third loss of the use of his hand, and should get compensation for such loss under the provisions of the Compensation Act governing the loss of use of a hand, or part thereof. The Industrial Commission decided otherwise, giving compensation for the loss of part of the fingers under the schedules in the Act providing for the partial loss of specific fingers.

In reversing the Commission, the Court held that the Workmen's Compensation Act must be decided liberally in favor of employees; that where there are two conflicting provisions, as in this case, the provision should prevail that gives the employee the larger award. The Court determined that the loss with respect to the use of the hand should be given precedence over the aggregate loss of the three fingers. fingers.

Lisowsky vs. White, et al. (Maryland) 9 A. 2nd 599 (Nov. 1939).

Strain of Back Results in Award

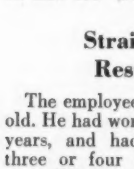
The employee was a man fifty-eight years old. He had worked for the company sixteen years, and had never missed more than three or four days' work because of illness. While carrying some iron pipe he tripped and fell and sustained injury to his back. The employee claimed the strain to his back "lighted up" and made active a latent osteoarthritis condition and resulted in permanent total disability. The Compensation Board made an award to the employee, which was reversed by the District Court. On this appeal the Supreme Court reinstated the Board's decision.

The Court said, injury from strain or over exertion due to a physical condition predisposing compensation claimant to injury is nevertheless an "injury" within the meaning of the Compensation Act, even though the strain would have been insufficient to have occasioned any serious physical injury, had claimant been sound in every particular. The employee was in good health prior to the accident, even though he had a dormant osteoarthritic condition; the accident was the exciting cause of the activation of the disease resulting in the disability and entitled the claimant to compensation.

Maul vs. Iowa-Nebraska Light and Power Company (Nebraska), 288 N.W., 532 (November, 1939).

Heart Attack Brought on by Heat Exhaustion Compensable

The husband of the claimant was a baker. On the night that he suffered a heart attack, he went to work about 7 P.M. It had been very warm all day, reaching a maximum temperature of 107 degrees about mid-afternoon. After working about an hour and a half, the deceased complained of the



heat. He perspired profusely, had chills, drank large quantities of water, and felt faint and weak. He continued working until 1 A.M., at which time he was taken home, feeling very ill. He died the next morning. Examination disclosed that he had been suffering from a very weak heart. The evidence was conflicting as to the exact amount of heat in the bakery, but it seemed clear that it was hotter in the bakery than outside due to the heat from the ovens, and the inadequacy of the cooling facilities.

The Court made an award for the death of the worker. It said, "Exhaustion by artificial heat causing the death of a workman in the course of his employment creates a compensable injury. Though the injury aggravates or accelerates a disease with which a workman is afflicted, it is compensable if death results from or was hastened by the injury."

West vs. Phillips (Iowa) 288 N.W. 625 Nov. 1939)

Heart Lesion Caused by Lifting and Jerking Engine Lever

The claimant was a shift engineer working in the defendant's ice plant. In the course of his duties he was compelled to lift and jerk on a lever in order to start a machine. While doing so one day he felt a pain in the region of his heart, became ill and dizzy. A medical examination of the worker showed a valvular heart lesion. The workman was forced to abandon all work. The medical testimony was to the effect that the heart lesion would not have resulted except for the lifting and jerking necessitated in the work of the employee. The Court held that he had suffered a personal injury by accident arising out of and in the course of employment, and an award was granted to him.

Earhart vs. Wible Ice and Cold Storage Co. (Kansas) 95 Pac. 2nd 366 (Nov.-1939)

Hernia Compensable Despite Lack of Evidence of any Wrench or Slip

In this case, the Court held, "A direct inguinal hernia sustained by a meat cutter while carrying a 170 lb. veal from truck in about the same manner in which he was accustomed to moving meat, was compensable, notwithstanding alleged lack of evidence of any slip, wrench or sudden jerk."

Hieronymus vs. Stone's Food Store (Idaho) 96 Pac. 2nd 435 (Nov.-1939)

Loss of an Eye Brings Total Disability Award to Coal Miner

A coal miner was tamping explosives preparatory to shooting off the face of the coal, when particles of coal dust lodged in his eye. These particles caused an eye ulcer which finally necessitated the removal of the eye. Two questions were before the Court: First, was there an accident for which compensation should be given; Second, what was the extent of the employee's disability.

The Court determined that the lodging of the coal dust particles in the miner's eye, while he was working, constituted a traumatic injury by accident, arising out of and in the course of employment, and was compensable. The Court said further, that the removal of the one eye, plus a twenty-five percent impairment of vision in the other, rendering the coal miner unable to perform manual labor, justified an award of compensation for "total disability."

Roberts vs. Black Mountain Corp. (Kentucky) 132 S.W. 2nd 941 (Nov.-1939)

Phlebitis Called "Injury" Not "Disease"

The claimant operated a gas shovel for a period of three days. During the digging operations the shovel continuously jerked and jolted the claimant, causing pain in his legs. Examination revealed that the claimant was suffering from Phlebitis, (inflammation of the inner membrane of the veins). The Industrial Board denied an award, holding that the disability resulted from an occupational disease, and was not compensable.

In reversing the Board's holding, the Georgia Court of Appeals said, "The Industrial Board erred as a matter of law in finding Phlebitis, caused by jarring on a steam shovel for three days, was an occupational disease. Any injury caused by a sudden jarring on a shovel over a period of three days is not an occupational disease but is an injury compensable under the Workmen's Compensation Act."

Lumbermen's Mutual Casualty Co. vs. Layfield (Georgia) 5 S.E. 2nd 610 (Nov.-1939)

NEW **LEHIGH introduces two, steel-toe SAFETY BOOTS with a revolutionary, exclusive**

"PAR-GRIP" NON-SKID SOLE

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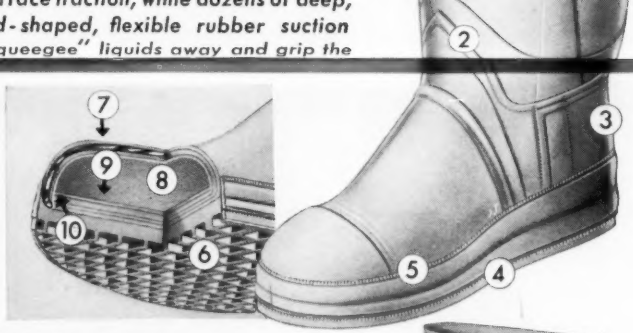
THIS NEW, LEHIGH "PAR-GRIP" SAFETY SOLE is more effective than any other sole pattern or construction we have yet devised to reduce injuries and expense caused by dangerous slips and skids on wet or greasy floors. The flat-bottomed, one-piece sole provides approximately twice the effective traction area of ordinary boot soles...and the diamond-shaped suction cups of which the sole is made, are more than a quarter-inch deep... *have thin, tough walls that flex with every* **tiny plungers. • If wet or slippery floors are a serious accident hazard in any de-**

diamond-shaped, flexible rubber suction cups "squeegee" liquids away and grip the

are more than a quarter-inch deep . . . have thin, tough walls that flex with every tiny plungers. • If wet or slippery floors are a serious accident hazard in any department of your plant, WRITE, WIRE OR PHONE US TODAY for a convincing, on-the-job demonstration of this amazingly effective new safety boot development.



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STOCK NO. 1115–Superquality, heavy duty white rubber knee boot with extra heavy white rubber sole moulded in one-piece, deep grid, anti-skid pattern and double vulcanized to upper with broad foxing. Has high-carbon-steel toe box built into sturdy, reinforced construction. Made throughout to give super service on the most gruelling jobs. In stock in sizes 5 to 12, whole sizes only.
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STOCK NO. 1116 — Special compound, white, all rubber boot shoe. Upper is highly resistant to most corrosive liquids and cleaning solutions. Has steel toe box, genuine leather insole, "Par-Grip" safety sole. In stock in sizes 5 to 12, whole and half sizes.
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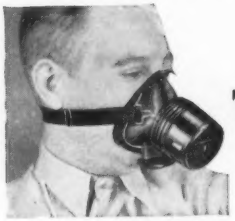


How to Take Care of Respirators

Today men will wear respirators when plant conditions require this type of protection. Five years ago the situation was different. Respirators were a distinct discomfort to the wearer. Today since the advent of Bureau of Mines specifications and approval of this equipment, the respirator is easy to breathe through and is an effective protection to the workman against harmful dusts and fumes. Air needed for respiration is inhaled through a filter and exhaled through a valve.

IT IS not enough for an employer to issue a respirator to the man who needs its safeguard. Its performance should be watched carefully and checked. If the filters are not cleaned or replaced at the proper time the equipment loses its efficiency. If saliva collects in the exhaust valve, it sticks making the respirator useless. Watchful care and proper cleaning of mechanical filter respirators, cartridge or fume respirators, and air line respirators, masks or helmets lengthen their life and give the workman the assurance that the parts touching his face are sanitary and that he is receiving full protection from dangerous dust or fumes.

Experience has shown that the following regulations when followed strictly are good practice:

1. Always issue the same respirator to a man. This can be regulated by a numbering system.

2. Collect the respirators after each work period in a container, clean it and have it ready for use.

3. Keep a record of the life of the respirator and the service of the filter.

Daily cleaning of the equipment can be done by the following methods: wash the rubber and metal parts with soap and water, immerse for 10 minutes in either a 3 per cent carbolic acid solution or a 2 per cent lysol solution or a 70 per cent alcohol solution. Then dip in water and dry. The filters, felts, screens, and elastics should be removed before washing.

Keep the respirator in a container when not in use. An ordinary paper bag may be used for this purpose.

By following the above suggestions not only will the respirators perform more efficiently and last longer but the workman will be better satisfied and the plant may save money.

Do you know—that oxygen under high pressure may cause an explosion if brought into contact with oil or grease? No oil or grease or other lubricant of any kind should be used to lubricate a regulator or to test the gauges used in connection with oxygen cylinders. Neither should the appliances be handled with greasy hands or gloves.

FOUNDRY ELIMINATES DUST PROBLEM

(Continued from page 10)

to the slight difference in temperature, outside wind action is low. Outside wind movement is necessary to increase the pulling capacity of roof ventilation. Knowing this, we included in these roof ventilators motor-driven fans, making it possible to obtain the required number of air changes in summer, regardless of atmospheric conditions.

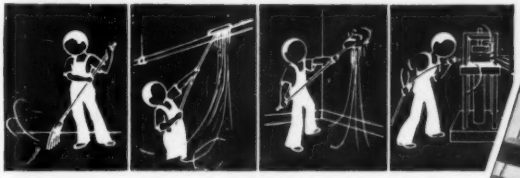
During the winter period, when high outside winds are blowing, and increased differences in temperature are registered, it is common practice to close most of the outside air inlets. When this is done, natural draft ventilation movement slows up. Again, with these fan ventilators, we overcome an apparent obstacle.

Speaking of air inlets, we have learned by experience that proper air inlets are necessary for proper ventilation. The ratio should be approximately one to one, at a minimum.

To sum up, we installed a total of eight 96″ diameter roof ventilators, all being equipped with 72″ diameter fans, operating at 575 r.p.m., using 15 horsepower motors in each. Oversize bases were used, and each ventilator had a capacity of 83,000 cubic feet of air per minute.

The reaction of employees is good. They appreciate the effort that is being made. Dry floor workers and cranemen are requesting more ventilators.

The argument that a ventilating system of this type may cause colds and pneumonia is not borne out by our hospital records.



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How State Factory Inspection Aids the Employer

STATE industrial safety and health laws and their enforcement are usually considered to be of benefit only to workers, letting the employer (like the devil) "take the hindmost." Yet there was presented to me only recently an array of arguments put up by an "on the job" front-line factory inspector which I think are worth passing along to readers of OCCUPATIONAL HAZARDS.

Asked by an employer to name just a few reasons why safety and health laws and the visits of the inspector could possibly benefit him as an employer, the inspector tells me he carried on about as follows:

"Every law that's on the books is there because of some condition or some thing or some act that is detrimental to the security, or rights, or safety, or liberties of some or all of our people. When enough people become aware that such a situation exists they get together and agree that 'there ought to be a law.' That's the way it is with industrial accidents. The accidents happening in any one plant don't make much of a show, but when they begin to get tabulated it looks pretty bad and a lot of people say, 'There ought to be a law.'

"As one of the enforcement officers, it's my duty to see that the rules and regulations under the law are complied with and as high a degree of safety achieved as is possible under the laws, which, of course, can do much more than regulate physical conditions in the workshop. But we feel in this state that our job goes further than just the mere enforcement of the law, and I think I can convince you that it's to your own selfish interest to go beyond the letter of the law and prevent accidents in your shop.

"In the first place, compliance with the laws and codes and other safety efforts can save you money—not only

By **W. T. Cameron, Chief Safety Adviser, Division of Labor Standards, U. S. Department of Labor**

the actual expense of the injury but about four to five times the actual costs which never appear on your books, such as damage to equipment because of the accident, let-down of morale, time spent by other workers caring for the injured, hiring and training another man to take the place of the injured workman. Good safety work helps cut your insurance premiums and saves you the mental stress and strain which comes every time one of your workers is hurt or crippled or disabled. But, most important, real attention to safety brings about better production, less spoilage of material—lack of safety usually means lack of operating efficiency. Finally, as a by-product of safety, you get better industrial relations through closer contact with your men through safety committees on the noncontroversial subject of safety.

Three Points

"It is my belief that every employer is entitled to know three things in connection with safety and health laws. First, the reasons behind that law, the conditions which led to its passage and something about how effective it has been so far in reducing accidents. Second, what the law means to you personally, what parts of it apply to your type of operation. Third, some information on how you can comply with the law, charts, blueprints, pictures and other information to bring about real compliance with the intent of the regulation. I think I am qualified and prepared to do all three of these things.

"As your inspector, in effect your public servant, I feel that I am competent to be your safety consultant and advisor for the following reasons: I come into daily contact with a variety of industries, both large and small, and have an intimate working knowledge of your manufacturing process. I have regular contact with successful safety engineers who have developed standards and in many cases novel methods for preventing accidents and who have produced enviable safety records. I can pass a good deal of their information along to you. I am well versed in the safety literature of national associations, Federal Government and State agencies.

"So, Mr. Employer, when you realize what I am here for, when you appreciate the fact that my visit can be of real benefit to you through cash savings as well as through intangible economies, I feel sure that I can count on your full co-operation—even going beyond the letter of the law—into a wholehearted compliance with its spirit and intent. I'm here to help you as well as your workers—

"Will you let me?"

Safety and Health Advisory Committee Meeting

PROGRESS in promoting industrial safety and health over the last 12 months and plans for further action were discussed by the Secretary of Labor's Advisory Committee on Safety and Health which met in Washington recently. The Advisory Committee consists of the following National authorities on industrial accident prevention and health conservation: Mr. V. A. Zimmer, U. S. Department of Labor, Chairman; Mr. Cyril Ainsworth, American Standards Association; Mr. W. H. Cameron, National Safety Council; Mr. John Frey, American Federation of Labor; Mr.

T. P. Kearns, Ohio Industrial Commission; Dr. R. R. Sayers, U. S. Public Health Service; Mr. A. W. Whitney, The National Conservation Bureau; Mr. W. H. Winans, Union Carbide Company; and Mr. W. T. Cameron, U. S. Department of Labor, secretary.

In view of the wide-spread distribution of the film, "Stop Silicosis," the committee suggested the preparation of other film strips on the causes and prevention of occupational diseases and of industrial accidents. Acceptance by five states of the qualifications for factory inspectors listed by the committee, and the general interest in the subject led to suggestions for still further adoption of these minimum qualifications, and to a similar listing of standards for factory inspection departments.

Discussing the action of the 1939 convention of the American Federation of Labor which recommended that affiliated unions set up safety and health committees, the advisory committee considered ways in which the Division of Labor Standards might help local union safety and health committees.

General policies concerning needed additions to safety and health literature were agreed upon.

FUME HAZARD . . .

FOLLOWING is an interesting case where an air mask would have prevented injury.

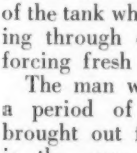
A workman was cleaning a tank which had been used to store gas tar, a by-product of a gas making machine. The tank had been filled with water for a period of five days. It was then flushed out and purged by removing man-hole covers and blowing air into the tank for a period of two days. After this, a man was sent in to clean the muck from the bottom of the tank while a blower was operating through one of the man holes, forcing fresh air into the tank.

The man worked in this tank for a period of two hours and was brought out for a rest. After being in the open air for about twenty minutes, he began to act strangely, similar to an intoxicated person. The men working with him had him lie down and administered oxygen and carbon dioxide. Under this administration he went to sleep. Oxygen was administered for a period of one-half hour when the man's foreman came in and roused him from this sleep very suddenly. The man immediately went into hysterics which was shortly followed by collapse. He was taken to a doctor and later to a hospital, at which time his condition was diagnosed as noted above. After twenty-four hours in the hospital he returned to work in normal condition and has continued to work without any ill effects.

We know now that in addition to the above precaution, this man should have been equipped with a fresh air mask.

Agents in Evansville

American Machine and Metals, Inc., has announced the appointment of George Koch Sons, Inc., as exclusive agents in Evansville, Indiana, for their line of DeBothezat Ventilating Equipment.



MINIMIZING CUTTING OIL SKIN INFECTIONS

"Skin infections . . . can be prevented by strict observance of proper sanitary conditions"

THE INFECTIONS that frequently appear on the skin of the operators of machine tools, where cutting and soluble oils are used, can be of two common forms; namely, that of small and more or less harmless pimples, or that of ugly, painful boils or carbuncles. Medical authorities class the pimples as primary infections. The larger and more painful infections, caused by the re-infection of existing pimples or sores, they term secondary infections. The causes and treatment of these infections have been the subject of considerable research on the part of chemists and medical men. It is not the purpose of this discussion, therefore, to approach the problem from this angle, but rather from the viewpoint of the user of cutting and soluble oils who encounters these problems from time to time.

The term "cutting oil" is frequently loosely used to refer to both cutting and soluble oils. Strictly speaking, a cutting oil is a pure mineral oil, to which some ingredient is usually added in order to improve its lubricating properties. A soluble oil, on the other hand, comprises essentially a mixture of a mineral oil and an emulsifying base. Although it may have the appearance of a mineral oil, nevertheless it emulsifies readily with water, forming usually a white, milky solution which has good cooling prop-

By J. T. Beard
Socony-Vacuum Oil Co.

erties. In this discussion, for the sake of brevity, the term "cutting oil" will imply both types of products.

It has sometimes been common practice to lay the blame for skin infections, arising from the use of these products, on harmful ingredients that oils were supposed to contain. Sulphurized-mineral cutting oils are made by cooking sulphur into a more or less stable combination with the hydrocarbons of a mineral oil. Similarly, sulphurized fat bases, frequently employed to increase the effectiveness of cutting oils, are made by cooking sulphur into one of the common animal or vegetable fats. All these operations are done at temperatures well above 300°F. The resulting products, therefore, are well sterilized, and no harmful concentrations of bacteria remain after the processes are finished.

Thus, the question naturally arises "How does the *use* of cutting and soluble oil promote skin infections?"

If the oil can penetrate the microscopic openings between the tool and the work it can also penetrate the pores of the skin.

One of the important initial sources of infection comprises the bacteria that normally exist on the human body itself. Medical authorities state that 57 distinct and different harmful bacteria have been found on the arms and hands of the average clean, healthy individual. These bacteria are perhaps the most important source of primary infections, the cutting oil itself acting as a carrier in transporting the germs from the surface of the skin, where they are quite harmless, into the pores, where they germinate and produce pimples, sores and rashes.

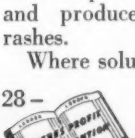
Where soluble oils are used as cutting compounds, one of the important sources of bacteria may be the water which is employed for the purpose of emulsification. In certain areas, particularly where hard water is encountered, the introduction of bacteria with the addition of water is accompanied by reactions that produce metallic sulphides and hydrogen-sulphide gas. The presence of the metallic sulphides turns the emulsion gray or bluish, and the release of the hydrogen-sulphide gas produces offensive odors. In this condition the emulsion generally shows a definite acidity, and the bacteria multiply rapidly. The situation can sometimes be improved by using another source of water, or by increasing the alkalinity of the emulsion. Excessive alkalinity, however, usually renders the emulsion a less effective lubricant.

Individual Immunity

It is common knowledge that not all operators are subject to infections. And it is said that fair-skinned individuals are especially susceptible. Moreover, infections are likely to be more common during the summer months, when the pores of the skin are open. During the winter, however, chapped skin also offers a ready entrance to harmful bacteria.

These primary infections are not painful and the chief objections to them are their unsightly appearance, the possibility of furnishing an additional source of contamination of the entire cutting-oil system, and the great possibility of their becoming reinfected.

Secondary infections are frequently of a serious nature and usually occur when the entire cutting- or soluble-oil system has become contaminated with harmful bacteria. The introduction of



these bacteria into pimples, rashes, sores, cuts or abrasions on the skin of operators, results frequently in the development of painful boils and carbuncles. Infections of this sort require frequent medical attention, impair the efficiency of the operators, and frequently necessitate complete overhaul of the entire system of cutting-oil supply.

Skin infections, either of the primary or secondary kind, can be prevented or eliminated by the strict observance of proper sanitary conditions, which provide for—

(a) The exclusion of germs from the cutting oil itself;
(b) The elimination of germs from the skin of the operator;
(c) The prevention of the entrance of germs into the pores of the skin, under which heading comes the important subject of personal hygiene, control and elimination of toxic substances.

Drums and tanks of cutting or soluble oils should always be kept well covered in order to exclude foreign material of any kind. Moreover, operators should be instructed to keep their arms and hands clean, and should not be permitted to expectorate into oil pans, drains, etc. Every precaution should be taken to maintain the original cleanliness of the cutting or soluble oil.

Operator Precautions

Operators should not only be encouraged, but instructed, to protect themselves by keeping their skin clean. They should wash their arms and hands thoroughly with soap and hot water before starting their shift in order to remove harmful bacteria that might be the cause of infections.

Use **Band-me-Quick** new Individual Bandage. Made of Gauztex. Self-adhering gauze sticks only to itself—not to flesh. Medicated pad. 9-inch length. Keeps out dirt yet air circulates freely. **No Throw-Aways.** Each Band-me-Quick cellophane wrapped. **Stays fresh.** 100 to a box. Order from supply house or GENERAL BANDAGES, INC., 508 S. Dearborn St., Chicago.

GAUZTEX
Band-me-Quick

Moreover, it is good practice after washing to protect the skin from infection by filling the pores with a suitable ointment. At the end of a shift, operators should again bathe, or at least thoroughly wash their arms and hands with soap and hot water before going home.

Since cutting or soluble oils can carry germs, not only into the pores of the skin, but also into cuts, abrasions, and skin rashes, any sores of this nature should receive prompt attention. In order to prevent scratching, it is always advisable to avoid the use of hard, stiff cleansing brushes which might scratch or break the skin. The use of waste or rags for wiping cloths is undesirable, since they frequently contain chips and metallic particles that produce scratches. Dirty wipe cloths are directly responsible for innumerable cases of infections and their use should be prohibited. Only clean, individual towels should be permitted.

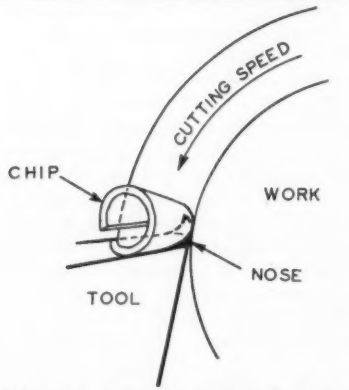
Change Clothes

Cleanliness in the matter of clothes is important. Operators should always

change from their street clothes to working clothes before starting their shift, and from working clothes to street clothes before going home. Working clothes should be washed thoroughly at least once a week, and underwear should be changed at least as often.

Operators who are particularly susceptible to skin infections should be assigned to machines that are segregated from the main cutting-oil system. In this way, the infections that they are likely to develop from time to time cannot spread throughout the shop.

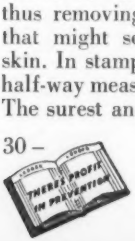
Every system should have some means for filtering cutting oil and thus removing fine metallic particles that might scratch or puncture the skin. In stamping out skin infections, half-way measures are rarely effective. The surest and safest procedure is to remove the cutting oil or soluble oil completely from the system, after which the tanks, piping and machines should be thoroughly cleaned, using a suitable disinfectant or germicide. New or sterilized oil may then be installed.



While not all cutting applications are as simple as this diagram would indicate, the use of oil to reduce friction and breakage is virtually universal. Proper sanitary rules reduce possible infections from this source.

In many plants, where large central systems supply cutting oils to groups of machines, disinfectants are commonly employed in order to prevent the growth of harmful bacteria. Generally speaking, the advisability of adopting a disinfectant is dependent upon the particular conditions encountered. In this connection it should be observed that the use of disinfectants may lead to carelessness on the part of shop men to such an extent that personal cleanliness will be neglected, and the liberal use of soap, hot water and clean wipe cloths will be ignored. Moreover, the use of excessive quantities of a disinfectant may lead to skin irritations. Where disinfectants are used intelligently, however, they are an effective means of minimizing skin infections.

Incorporating a disinfectant in cutting and soluble oils during the process of manufacture, is debatable, since many plants object to the odor of the disinfectant. Generally speaking, an odorless cutting oil is preferred, and the odor is tolerated only where certain specific benefits are required, such as the prevention of skin infections. Regardless of the efficacy of germicides in preventing skin troubles, the preferred procedure is always the careful observance of sanitary rules. Wherever proper attention is given to cleanliness and sanitary conditions, infections arising from the use of cutting oils have been avoided, or, if they previously existed, they have been completely stamped out.



RADIO DRAMATIZES FEDERAL PROGRAM

Efforts of the Federal Government to safeguard the life and health of industrial workers throughout the country was dramatized for radio audiences on Sunday, February 4, at 2:00 o'clock (EST).

The program, broadcast over the 107-station Nation-wide network of the Columbia Broadcasting System was entitled "Life and Limb." It is the first in a series of five similar broadcasts on succeeding Sundays at the same hour. These programs have been prepared by the Office of Education, Federal Security Agency, in co-operation with the U. S. Department of Labor, and are devoted to American labor problems. These broadcasts are a part of the "Democracy in Action" series, high-lighting services of the Government to individuals.

Free booklets concerning the subject matter of the various broadcasts are obtainable by writing to: "Democracy in Action," Federal Security Agency, Washington, D.C.

Safety Exhibit

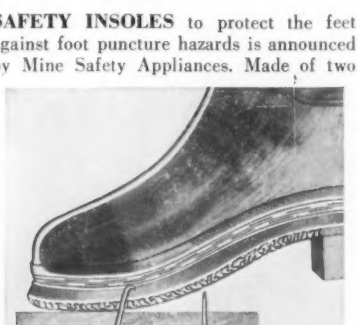
BECAUSE of the increasing importance of protective equipment in the prevention of Occupational Disease, "Modern Man at Work," an exhibition of protective equipment worn by workers in various occupations and professions, has been placed on view in the science department of the Newark, New Jersey, Museum. Masks, shields, goggles, respirators, helmets and other devices are included, designed to minimize working hazards in industry. The display will be shown through March 11, 1940.

One section of the display is devoted to respirators used to protect the lungs and respiratory tract from fumes, dust, vapors and gases. Some are made for specific industries and others, are more general in application.

CORROSION-RESISTANT alloy sheets have been developed by Haynes Stellite Company, a division of Union Carbide and Carbon Company. It is said that the new alloy resists wet chlorine; has good resistance to hydrochloric acid up to 50 deg. c. and to sulphuric acid up to 70 deg. c. in 50% concentrations.

SUPER DURALITE goggle with a non-rubber headband is the newest addition to the line of American Optical Company. The eyecups are moulded from a special material which gives light weight and long life, plus imperviousness to oil, water, grease, and perspiration.

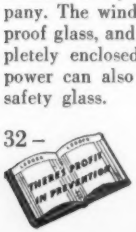
SAFETY INSOLES to protect the feet against foot puncture hazards is announced by Mine Safety Appliances. Made of two



layers of flexible spring steel, the insole can be worn in workers' shoes with comfort.

A FAN UNIT, by South Bend Air Products, Inc., has the motor entirely outside the air stream. For removing air contaminated with abrasives, inflammable substances, and other corrosive or hazardous materials, this fan unit is entirely safe and free from excessive deterioration. Handling from 1600 to 26,000 C.F.M., the unit is easily installed in any duct line.

GRINDER SHIELD with built in light is announced by the Boyer-Campbell Company. The window of the shield is shatterproof glass, and all electrical wiring is completely enclosed. Magnifying glass of any power can also be had instead of regular safety glass.



New Produc

CIRCULITE is a new portable, high intensity light for industrial use. Extreme

mobility and a tilting beam are particular features.

A REFRIGERATED CARTON for the safe shipment of serums, vaccines and other perishable biological products has been developed by the Container Corporation. In the new carton, these products can be shipped to any part of the United States at a constant temperature of from 32 to 42 degrees.

Additional information and descriptive literature on any of the products mentioned in this service department may be obtained by writing ***Dept. N,*** OCCUPATIONAL HAZARDS & SAFETY, *812 Huron Road, Cleveland, Ohio.*

THE FIELD

A NON-ALCOHOLIC solution of iodine is now available from Davis Emergency Equipment Company. The product, named Isodine-Davis, has the same antiseptic properties as the usual tincture, but is less painful when applied, does not burn tissue, and penetrates more deeply.

SAFETY FEEDERS and pickers for feeding and removing work in punch presses have just been announced by F. J. Littell Machine Company. The device operates on the vacuum principle, and is said to materially increase speed and safety of feeding.

AIR HOSE for hose masks, which is highly resistant to penetration by organic vapors, has just been developed by Davis Emergency Equipment Company. The new hose is particularly intended for use where petroleum or vaprous rubber solvents are encountered.

STOCKLITE, a lighting fixture especially designed to direct light along the narrow bins of stock rooms, is announced by the Goodrich Electric Company. Improved lighting of stock rooms, and reduction of glare make the new light of interest to safety men.

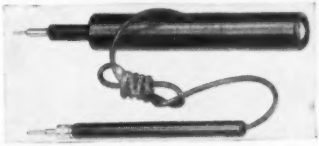
Statements made in connection with any product mentioned in this service department are based on manufacturers claims. Although these claims are believed to be true, this magazine does not guarantee that to be the case.

BATTERIES that do not deteriorate feature the new line of emergency lights and flares developed by Triumph Explosives, Inc. In any place where light is needed in

emergencies the new lights may be provided, and kept indefinitely without losing their potency With these devices no concern need be felt for renewal of old but unused batteries, nor for their possible failure in emergencies.

SAFETY TEST LAMP and voltage indicator that features safety has been introduced by The Sittler Company, Chicago. It is distributed under the trade name SG-100 Test Lamp and can be used on AC or DC circuits from 110 to 600 volts.

No fuses are required for safety and there



is only one test lead. Excessive voltage burns out a lamp filament only. A resistor limits the current to such low value that there is no danger of tripping relays when checking control panels.

A large test prod holder contains a 5000 ohm 20 watt capacity resistor of single layer Nichrome wire wound on porcelain core.

PLANNING THE SAFETY AN

ACCIDENT prevention work in all industry today has *one* main purpose—that is preserving the human life and keeping the human body whole, well, and physically fit. The real motivating force in safety today is the desire on the part of industry to send each and every employee home at the end of the day in the same physical condition as he was when he came to work.

That sounds like a very simple objective. It is neither simple nor easily accomplished. To send each employee home each night well, and physically fit, day after day, week after week, month after month, is no small task. It takes the same careful plant organization and synchronization as does any production job. And, it takes a better sales promotion campaign than just selling merchandise because in selling safety you are selling an intangible. You must sell an idea rather than a piece of merchandise.

Too often people working in safety don't know where they are going; there is lack of organization in safety work. It is often approached in a haphazard manner and then the surface is barely scratched. There is much talk but a lot of it is idle talk. Signs are posted only to become covered with flyspecks and forgotten. Accidents occur and a tremendous hullabaloo is raised. A concentrated safety drive is started because an accident occurs, and it lasts for all of three days.

Do you wait for something to go wrong in a furnace before you worry about it? No. You analyze the job and then constantly strive to prevent mechanical troubles, breakdowns, etc. You find the cause and the effect and then try to eliminate the cause.

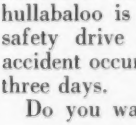
Today in manufacturing all production is organized. Past operating costs are figured, budgets are made, costs are estimated, time studies are made, all possibilities for trouble are studied carefully and preventive measures are taken. Then all superintendents, foremen, group leaders and workers are carefully instructed. In other words, there is careful organization made before the job is ever begun. Management knows where it is going.

We must organize for safety by the same careful planning. Safety is a definite part of production. *First*, the application of safety deals solely with the most important cog in the industrial wheel—the man. *Second*, the practice of safety is a great cost reducing factor, and *third*, a successful safety program increases operating efficiency. How could anything be more closely related to the actual manufacturing of a product?

Management

To have an effective safety program in any industry, management must first be sold on the need for a safety program and then take the

By **BENTON H.**
Merchandise Division
Westinghouse



ORGANIZATION OF A HEALTH PROGRAM

lead in safety work. After management is sold it cannot delegate the organization and administration of the safety program to just anyone. Management must realize that the safety program is just as important in plant efficiency as any other activity. Wasted man power is a greater loss than wasted material. The chief objective of a Safety Program is to eliminate this needless waste.

Let us assume that a man loses three fingers in an industrial accident. Many believe that the doctor's and hospital bill are the outstanding costs. This is not true. These usually would not exceed $200. The industrial compensation in our state would be approximately $1,600. The costs of this accident don't stop here. Hospital, doctor and compensation—$1,800. Any man who loses three fingers from his right hand will, nine times out of ten, have to be trained to do a new job. Industrial concerns estimate it costs from $200 to $1,000 to train a new man. Can we forget this item on the injured man who comes back to work following an accident?

Selling Safety

In selling safety to management on the cost reduction basis, we cannot forget the item of vocational rehabilitation which will figure this case at a minimum of $200, bringing the cost of this one accident to $2,000. Also, when figuring costs of lost time accidents we must evaluate the time lost in production at the time of the accident and the time spent after the accident in getting the department reorganized to continue efficient production. If the man is a highly skilled laborer it may be necessary to hire a new man or make transfers within the organization to carry on efficiently with the production schedule. It is fair to figure these intangible costs on any serious accident at $100. This one accident, therefore, has cost the company approximately $2,100. So, accident prevention reduces costs and increases profits.

Management must vest the responsibility for safety in competent hands. Successful safety work takes much time, study, perseverance and balance. The safety man's job involves many details, such as keeping accurate records, investigating accidents, organizing safety committees and advising them, aiding foremanship training and a host of other activities. To carry on this safety program there must be a safety organization.

Study Conditions

Let us remember that an organization such as I have suggested is only a futile gesture if it does not function. Inactive committees are just about as useless as a cup of water to a drowning man.

After careful organization, the *first step for management is to make the conditions of the workplace physically*

GOODENOUGH
Safety Supervisor
Elec. & Mfg. Co.

safe. Machines and processes must be safeguarded; equipment must be adequate and safe; floors, ventilation and lighting and all other conditions satisfactory. When this is done, and only when it is done, can management and the general safety committee and safety director ask the workers to take an active part in safety.

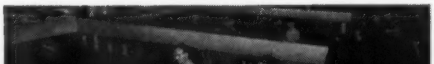
When all machines, equipment, and material things are made safe—when "good housekeeping" is a reality rather than a word—when all of these things are done—then and only then does the safety program begin.

The subcommittees are the key to the success of the safety program. These committees should meet once every two weeks. A recording secretary is necessary to take the minutes of the meetings and to pass them to the safety director. Any problems regarding safety which these committees cannot solve will thereby be called to the attention of the safety director who will have them discussed by the general committee.

Active participation of all employees can be obtained by rotating the membership of these subcommittees quarterly.

The second part of a safety program deals with the problems of keeping that organization moving. In other words—a promotional program is the most difficult task of the safety director and the general committee.

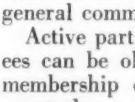
There are many steps in the promotion of safety. *First*, is the education of foremen and their men. The *constant* and *efficient training* of foremen keeps the thought of safety in their minds. If safety is always in the mind of the foreman he will see to it that it is relayed to his employees, for as the foreman thinks and works so think and work the men under him.



The organization of a health program goes beyond simply making equipment available to the workers. Such a plan must be workable, must have the understanding and full cooperation of management.

The foreman should be constantly and steadily supplied with safety literature and information which applies specifically to his departmental work. The material, must be directly applicable to the foreman's department. Do not send literature on the safe promotion of punch presses to the foreman of the plating department.

The second successful method of promotional safety is to promote safety contests in which departmental awards are given. The spirit of competition, if properly developed, can



do excellent promotional work.

A large safety board at the main entrance of the factory, showing accidents and where they occurred, will help promote safety for as each employee comes to work he is reminded that safety is important. At Westinghouse we change the design of that board frequently. Recently we used a large board showing accidents by departments. We listed days lost, frequency and severity. We just redesigned the board and put lights on it. A red light denotes an accident during the month and a white light denotes "no accident."

Safety bulletin boards are also effective in promotional work if new material is supplied regularly. Don't put a poster up and leave it until it rots. Change posters once a week.

There are many other means of promoting safety. Safety meetings with entire departments—safety news letters sent out periodically to all employees—photographs taken at the scene of the accidents.

Soon, I believe, motion pictures will become one of our main promotional mediums. More and more we are seeing safety pictures throughout industry and before many years have passed the well equipped safety department will have its own projector and show safe practice pictures.

Promotional literature, posters, bulletins, letters, cards and pamphlets of all sizes, shapes and descriptions are available through many sources.

In building a safety program remember that *first, management must be behind the move 100 per cent; second, a safety director and general safety committee are needed; and third, that departmental committees and foremen are the key to success in safety.*

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Pulmosan offers you one of the most complete lines of specialized Hoods, Helmets and Gas Masks on the market. Each is scientifically designed to give the most effective protection for its purpose. If your plant has the above hazards or operations, tell us your needs to get full details and prices on the correct device for your requirements.

PULMOSAN

SAFETY EQUIPMENT CORP.

Dept. OH, 176 Johnson St., Brooklyn, N.Y.

–37

SOLVENTS . . . can be handled safely

(Continued from page 17)

6. Methylene dichloride
7. Trichloroethylene
8. Tetrachloroethylene, Tetrachloroethane
9. Chloroform
10. Ethylene dichloride, dichloroethane, pentachloroethane

The aromatic hydrocarbons such as benzene, toluene, xylene, and solvent naphtha, find wide application in the rubber, lacquer, dry-cleaning, paint, and varnish industries. They are also used in degreasing, in printing inks, and silk-finishing. There are over 100 million gallons of benzene manufactured in the United States every year. However, not all of it is used for solvent and diluent purposes.

Since these aromatic hydrocarbons are so highly toxic, they present a severe health hazard. In considering the toxic effect of benzene vapors, there are records which prove that as little as 1600 parts per million has given rise to cases of slight poisoning, and exposure to 19000 parts per million for one-half hour has proved fatal.

Symptoms

Some of the symptoms of benzene poisoning are giddiness, fatigue, stupor, headache, nausea, and gastric disturbances. In more severe cases it will damage the blood-forming organs and bring about degenerative changes in the white and red blood cells. In serious forms of benzene poisoning, the central nervous system is affected showing the following symptoms: convulsive movements, paralysis, and unconsciousness. These citations are only a few of the symptoms merely to give some idea of the real danger of benzene.

Since toluene is less volatile than benzene, its toxic effect appears to be weaker and there are fewer reports of injury. However, toluene resembles benzene both in its acute and chronic symptoms. By prolonged exposure to either xylene or solvent naphtha acute poisoning may result with symptoms which are very similar to those of benzene. A word of caution should be given here and that is, that the same respect should be bestowed upon toluene, xylene, solvent naphtha, ethylbenzene, and turpentine that is so readily allowed for benzene in recognition of its poisonous and inflammable properties.

Toxic Effects

These solvents exert a special effect upon fat metabolism. Prolonged inhalation of the vapors of these solvents may result in poisoning with symptoms somewhat similar to benzene poisoning.

Generally one can say that in concentrated form the aliphatic and aromatic hydrocarbon vapors are toxic, differing only in their specific effects. In less concentrated forms, the degree of harm which these can exert is governed by the specific working conditions and the susceptibility of the individual.

The polymethylene derivatives, such as cyclobutane, cyclopentane, and cyclohexane, are employed in degreasing, as paint and varnish removers, as paint thinners, in the rubber industries, and as an ingredient in polishes. In regard to their toxicological nature these solvents appear to be weaker than benzene.

Methyl chloride, choloroform, and ethylene chloride are used as gen-

eral anesthetics. By inhaling their vapors, nausea, vomiting, and intoxication are produced. In more concentrated form, these vapors will affect the central nervous system and, in the fatal cases, narcosis of the liver and the kidney are reported. No workman should be subjected for any length of time to an atmosphere containing more than 100 parts per million of a halogenated compound.

Alcohols are generally employed in the manufacture of varnish, lacquer, safety glass, collodion, artificial silk, photographic films, and antifreeze. Over 100 million gallons of ethyl alcohol were manufactured last year for industrial purposes. Methyl, ethyl, propyl, butyl, and amyl alcohols, when inhaled in sufficient quantities, exert a narcotic influence on the central nervous system. They all produce a state of intoxication, and damage the liver and kidneys. In the case of methyl alcohol, blindness is added to its narcotic score as an additional hazard. The higher alcohols show fewer cases of poisoning for the reason that they are neither so volatile nor are they used in the same large quantities as are the lower alcohols.

The largest outlet for esters is in the lacquer, varnish, celluloid, safety glass, and artificial silk industries. The vapors of methyl, ethyl, propyl, butyl, and amyl formates are irritating to the mucous membrane and have a paralytic action upon the central nervous system. An atmosphere containing 330 parts per million of any of these compounds has been reported as dangerous. The esters of acetic acid, such as methyl, ethyl, butyl, and amyl acetates, are milder than the formates in their narcotic nature. There is no proof against the esters of propionic, butyric, and lactic acids for being toxic, but this does not mean that exposure to their vapors can be conceded to be harmless.

The ketones, such as dimethyl ketone, methyl ethyl ketone, and dipropyl ketone, in vapor form, are irritant and narcotic.

The group of solvents known as ethers, and pyridine with its derivatives, are narcotic.

The glycols such as ethylene glycol, diethylene glycol, and their derivatives, which are monoethyl ether of ethylene glycol, monomethyl ether of ethylene glycol, diethyl ether of ethylene glycol, monoethyl ether of diethylene glycol, and monoethyl ether acetate of ethylene glycol, are used as solvents for dyes, in lacquers, in antifreeze mixtures, and as wetting agents in textile dyeing and scouring. These compounds act both as depressants upon the central nervous system, and as metabolic poisons.

Great care should be exercised in using any solvent for internal use

Safe Plant Is State of Mind

A medicine chest and some mechanical guards enclosing moving machinery do not make a safe plant.

A safe plant is a state of mind. Not just the foreman or the general foreman or the plant superintendent or the big boss—but every employee in the plant must be in a frame of mind that is receptive to and enthusiastic about anything that will prevent accidents.

When everyone knows what to do, the correct way to do it, is able to do it that way and has the determination to do the job as his knowledge and skill dictate—then you will have a safe shop!

which has not been thoroughly investigated. The seriousness of this admonition is confirmed by what had happened recently when sulfanilimide was dissolved in ethylene glycol. When ethylene glycol is taken internally, it is oxidized and converted to oxalic acid → glycollic acid → carbon dioxide and water.

So far, I have painted a rather discouraging picture of the relative toxicity of solvents by condemning their vapors as a whole, for being toxic in varying degrees. But we cannot be blinded to their infinite usefulness and their necessity for continuing our modern civilized living.

With the proper precautions, we can handle these vapors, which are such a threat to health, by providing an efficient local exhaust system wherever workmen come into contact with them and are exposed for any length of time to their fumes, by the use of proper personal protective equipment, and by the very important assumption that proper medical supervision is always at hand.

Goggle Tip

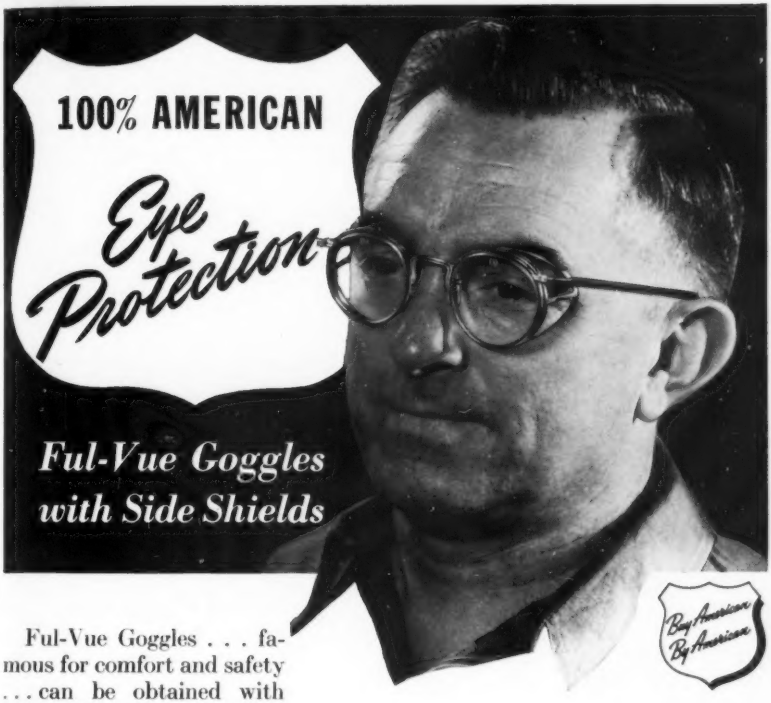
Goggle wearers sometimes complain that they get small pieces of dirt in their eyes. One safety engineer found that the workers who made the complaint had the habit of pushing the goggles from their eyes onto their foreheads. Particles of dirt were being pulled down from the forehead into the eyebrows and onto the face. Thus, the material was already under the goggle and in position to get into the man's eyes. He suggested that men be instructed to wipe off their foreheads before raising the goggles, and to wipe off their foreheads underneath the lower edge of the goggles before dropping them down onto their faces.

Cement Plants Get Results

With plant activity 20 per cent greater than during the first six months of 1938, all cement plants of the Portland Cement Association have made a remarkable gain for safety during the first six months of 1939. In 1937, the accident frequency rate was 5.71 per million man-hours worked. In 1938, this was reduced to 4.61 and for the six months ending June 30, 1939, the frequency rate was down to 4.00. A similar reduction was made in the severity rate, which fell from 2.44 in 1938 to 1.42 for the first half of 1939. June was the banner month, with a frequency rate of only 2.50 and a severity rate of .25. Since 1934, the cement industry had advanced from fourth to second place in low accident frequency in 1938, being led only by tobacco manufacture in the industrial groups.

Exposure to Nitrous and Nitric Oxide Fumes

Several workers were placed on the job of repairing the bottom of an acid chamber. The next day, one of the men felt sick. He reported to the doctor, and then indicating that he felt better, he returned to the job. After work he reported to the doctor again and said that he felt fine. About midnight his condition got worse; the doctor was called and he was sent to the hospital. He died a few hours later of pulmonary edema presumably from exposure to nitrous and nitric oxide fumes. Better ventilation or good respiratory protective equipment will protect men who are called upon to do jobs such as this.



Ful-Vue Goggles . . . famous for comfort and safety . . . can be obtained with side shields for complete, all-round protection. These shields are non-corroding wire mesh, easily cleaned, do not impair comfort.

To fit all faces, there are 3 sizes of Ful-Vues with side shields: small, medium, large. And *each* of these sizes is now available in a range of 3 eye-sizes and 3 bridge-sizes. Another new feature is the double-braced bridge . . . better-looking, more durable. *Plus* the important standard feature of 6-Curve Super Armorplate Lenses, deep-curved for extra impact-strength. Write for the recent AO publication: "News About Ful-Vue Goggles."

AMERICAN OPTICAL COMPANY

Factories at Southbridge, Mass.

MANUFACTURERS, FOR MORE THAN 100 YEARS, OF PRODUCTS TO AID AND PROTECT VISION

Why Worry about Dust?

THE M. S. A. MIDGET IMPINGER

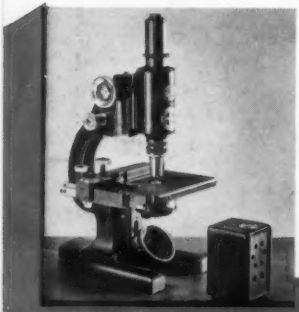
Hand operated, weighs only 9 lbs. complete with 9 Impinger tubes; easy to carry and use on-the-job, requires no electricity or compressed air to operate. Employed by Federal and State Departments, insurance companies, and mining and industrial concerns in every field. Bulletin No. CT-1.

. . WHEN YOU CAN KNOW YOUR DUST HAZARD

The dust problem looms largest where information regarding it is least! *Knowing* the extent of your own dust hazard means freedom from concern about the "might be's" . . . reducing suppositions to *facts* clears the way to safety.

At low cost and with little effort you can now take the two steps necessary to reliable dust determination in your own plant . . . greatly simplified by M.S.A. First—*collect* samples of the dust contained in the working atmosphere with the low-priced new M.S.A. Midget Impinger; second—*count* the dust particles in the sample, easily accomplished with the M.S.A. Microscope for dust counting, and the M.S.A Microprojector which greatly facilitates the operation of counting.

With these modern M.S.A. Instruments, difficult procedures and complicated apparatus is now a thing of the past in practical dust determination. Let us send you descriptive bulletins, and any special information desired, on the complete M.S.A. Line of air hygiene equipment for the reliable determination of, and protection against, atmospheric contaminants.



THE M. S. A. DUST-COUNTING MICROSCOPE

Especially designed for simple operation in counting dust particles. Inexpensive, but precise, with high-grade optics and accurate adjustments. Bulletin No. CT-2.

★ ★ ★

THE M. S. A. MICROPROJECTOR

Projects the image of dust particles in a sample on a field 20 inches square, with a magnification of 1,000 diameters for counting and 10,000 diameters for particle size measurement.

MINE SAFETY APPLIANCES COMPANY

Braddock, Thomas and Meade Streets, Pittsburgh, Pa.

District Representatives in Principal Cities